

## *View from Operations - RHIC Run 13*



Reid



Brian



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Iris



Jordan

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Tasha

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Chris

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# Overview

- Machine specialist/operations was in charge of start-up/commissioning
  - This was successful as it was a clearly defined role which set the pace for each day
- Expectations within a given shift were overall reasonable
- Operations was able to continuously put up stores at the end of the run that were nearly identical
  - Experiments were able to anticipate the next day

# Overview continued

- Better organization prior to APEX
  - Tool to identify machine configuration needed for particular APEX, live configuration and convenient way to change and revert specifications.
- Direction for operations on how to use unpolarized proton beam to optimize usage of time in the event when the polarized source is unavailable
- Continue to improve Experimenter/MCR communications
- Communications
  - Improve and aim for effective transmission and reception of information between members of the department and group
  - Condescending, inconsiderate, disrespectful, and/or disorganized means of communication is not effective in conveying information
  - A person needs to feel comfortable in order to be effective in communicating, learning, and doing
  - A proper and common communication protocol should be implemented with a goal for improved performance

# Technical Improvements

- AGS Main Magnet's signal patch panel connected to a multiplexer to allow and provide signals for diagnostics
- RF group needs to make their system more easily accessible to operations
  - PET pages buried deep in PET tree locations that are not intuitive
  - Logged data in logview is hard to find and not descriptively named
  - Consider having an operations liaison work with RF liaison to make system more transparent
  - Consider giving priority to making this improvement
    - Ultimately may free up RF personnel to do other tasks
- Have quality LINAC tank phases (or voltage) measurement logged

# Tech Improvements Cont.

- G10
  - G10 outputting much weaker voltage than historically
  - Over a month the nominal setpoint had to be increased by ~15% to compensate
  - Difficult to convince malfunctioning
  - Setup for APEX low energy.
- RHIC dump
  - Yellow dump was consistently causing QLI's
- H10 for low energy proton APEX
  - ps low voltage regulation issues
  - Attempted Workaround before H10 ps replaced for low energy
    - G10 kicker trigger occurs on next rising edge of the  $\frac{1}{4}$  frev with respect to the async FEB Request
    - H10 Discharge trigger real time delay from FEB Request
    - Green synchro qualification by AGS frev 19 x RHIC  $\frac{1}{4}$  frev less intrinsic jitter between kicker and septum trigger less horizontal ATR beam path variations



# Tech Improvements Cont.

- IR angle creep/orbit feedback
- Booster cap only at a particular location B7 should be throughout the entire ring as when scrapping scheme needs to be changed the necessary retuning of the Booster will not be immediate and trivial.
- Would like a scope signal of the raw AGS radial average and beam phase error signal the RF uses for diagnostic purposes
  - Currently only a temporary solution to this issue and ideally would like higher resolution

# Scheduling

- Schedule was organized and well thought out for the day once stable running conditions were achieved in mid to late April.
- More efficiently develop a formula for injection for operations that details the expectations and criteria for beam parameters to optimize physics stores. Frequent changes make it difficult for the operator to figure out their role and goal and leads to disorganization.
- Schedule should be re-evaluated in instances when failures or events outside of our control make it impossible to stick to the plan
  - Weather
  - Personal emergency
  - If adjusting the schedule is not an option then having people on call to help or give advice would be useful
- Breaks and lunch should be scheduled and adhered to as best as possible

# RHIC Fill Time Allocation

- Best Case Scenario after newfill event
  - ~2 minutes - 6x6 bunch Chromaticity Measurement to properly adjust to 4 units.
  - ~7 minutes - 109 bunch fill in single ring for polarization measurement
  - ~14 minutes - Filling Blue and Yellow ring
  - ~10 minutes - Energy ramp
  - ~10 minutes - Rotator ramp
  - ~3-5 minutes - Ramping Landau voltage down/up and taking 1<sup>st</sup> storage polarization measurement
  - ~ Total 46-48 minutes needed before triggering physics



# Morale

- Scheduled lunch and healthy breaks would contribute to better performance and health
- Machine Specialists in combination with OC's and Operators have decades of combined experience
  - Taken at word when stating that system is broken
- Operator burn-out due to insufficient operators on top of an already demanding 24/7 rotating shift schedule

# Personnel Shortage

- Operators were pulled from other teams to make-up for the shortage
  - During the day shift this IS helpful and also does not interfere with that individuals recovery from nights and circadian rhythm
  - If hiring more operators is not an option – Utilize OC's and machine specialists for this purpose as well
  - Despite this additional strain – we were still precariously close to forced operations shut-down due to not fulfilling the requirements set forth in OPM 2.5.7.1.2 (at least one operator is to be on with any given coordinator)
    - Management should be aware that an operations shut-down is imminent if continuing to run with our current staffing conditions (ie. Family emergency, injury)

# Personnel Shortage Cont.

- Ultimately - In the absence of fully-staffed teams, under-staffed teams need to remain under-staffed when working evenings and overnights, *rather* than pulling a member from another team into their shift
  - organization as a whole will suffer and it will create a greater negative impact than just having a smaller team doing the job
    - Higher operator error
    - Higher operator turnover
  - Unscheduled days and off days are extremely necessary to recover from the constant rapid cycling operator schedules undergo – they are not optional
    - Biological processes need time to adjust

# Personnel Shortage for FY14

- Main problem that faces Operations going into the next run
  - Will affect every aspect of performance
- Merely replacing lost staff will not replace the combined run experience
  - It takes years to fully train an operator

# Personnel Shortage for FY14 Cont.

- Inexperienced operators (due to lack of run experience)
  - Higher frequency of operator error
  - Routine machine operation completed more slowly
  - Common problems often poorly diagnosed
  - Example of this was Run 08
- We are a group of passionate, dedicated, and intelligent people with similar goals that drive us to persist and strive for success. However all gears that comprise CAD must be maintained and lubricated in order to optimally function as a whole.

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